Potential for a Sustainable Feedstock Supply: Agriculture & Forest Resources

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TRANSITION TO A BIO ECONOMY

The Role of Extension in Energy

June 30 – July 1, 2009 Doubletree Hotel, Little Rock, Arkansas

This conference is a collaboration of USDA Office of Energy Policy and New Uses, Farm Foundation, the University of Arkansas, and USDA Cooperative State Research, Education and Extension Service

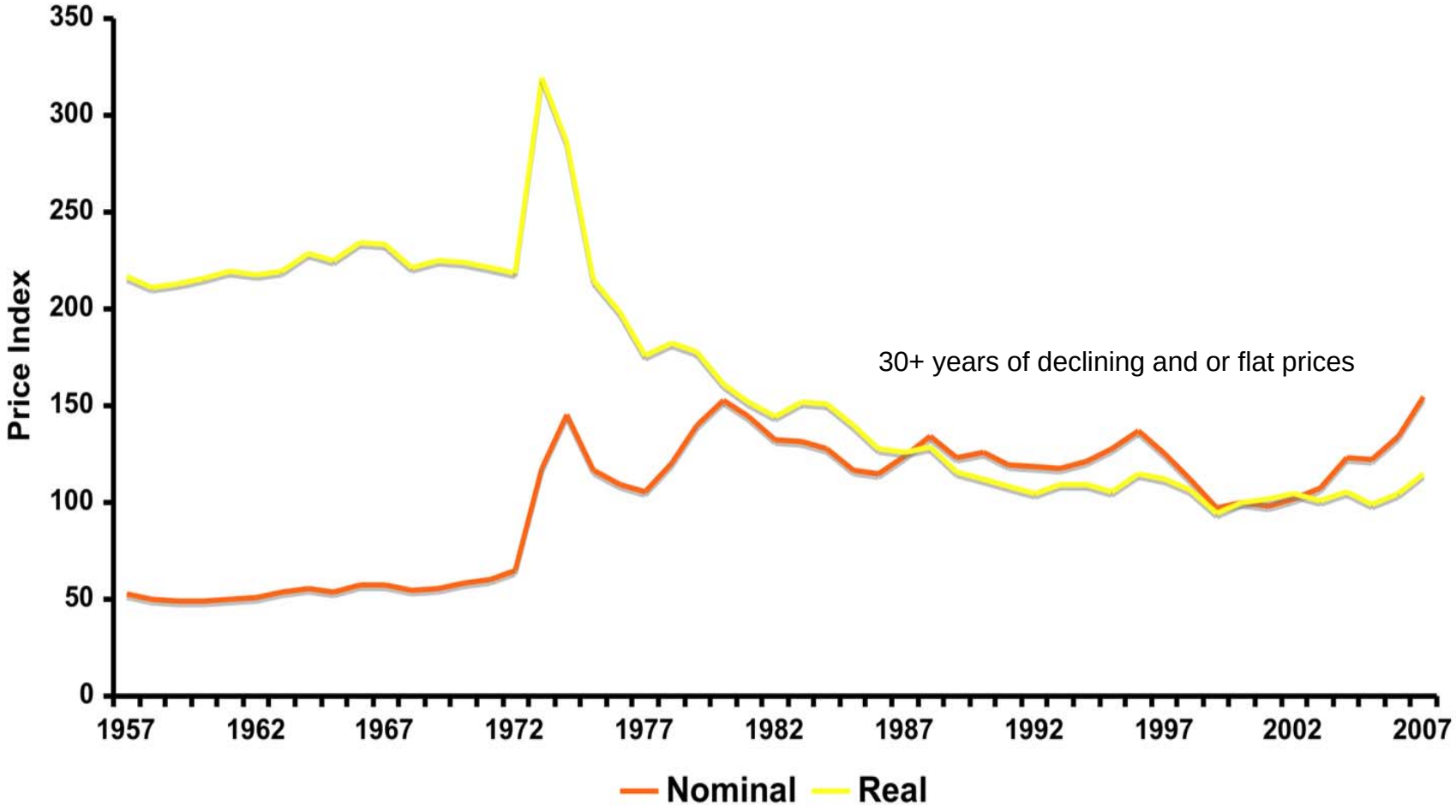
The University of Tennessee

Agricultural Economics

Sustainability

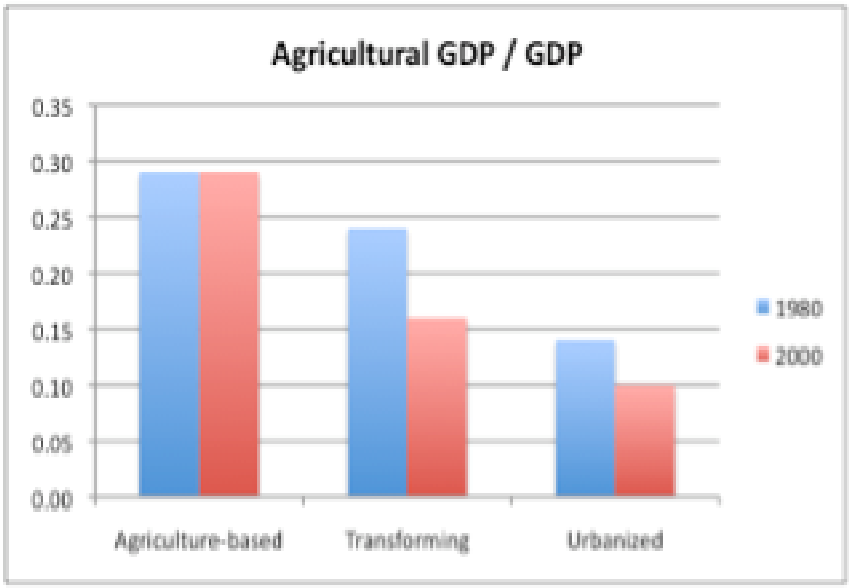
- Elements
  - Economic
  - Social
  - Environmental
- Driving Variables
  - Prices
  - Investment

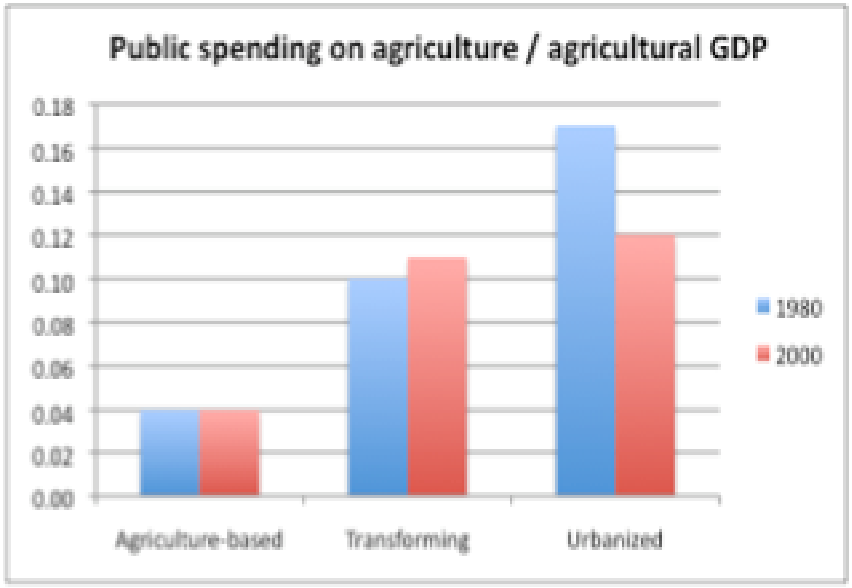
Long term trend in agricultural commodity prices



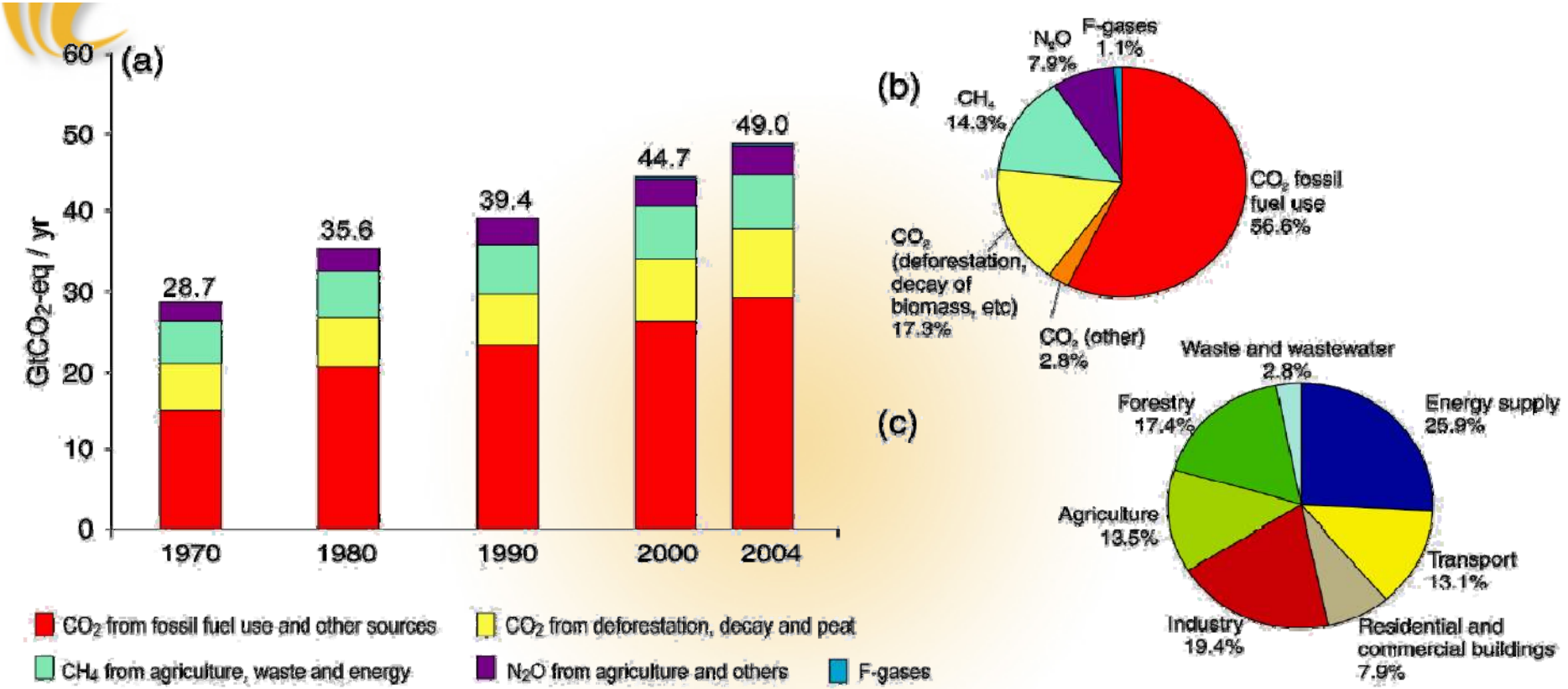
Source: International Financial Statistics Online, IMF February 10,2008. Except for real price in 2007, which is estimated by author.

Public Spending in Agriculture has stagnated and it is the least where is needed the most





Global Anthropogenic GHG Emissions



Source: Fourth Assessment Report, IPCC (2007)

(a) Global annual emissions of anthropogenic GHGs from 1970 to 2004. (b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of $CO_{2\text{-eq}}$. (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of $C0_{2\text{-eq}}$ (Forestry includes deforestation.)

GHG for ag and forestry is to address the 31% of annual emissions coming. If we take care of this we take care of → 0.26% Searchinger, et al.

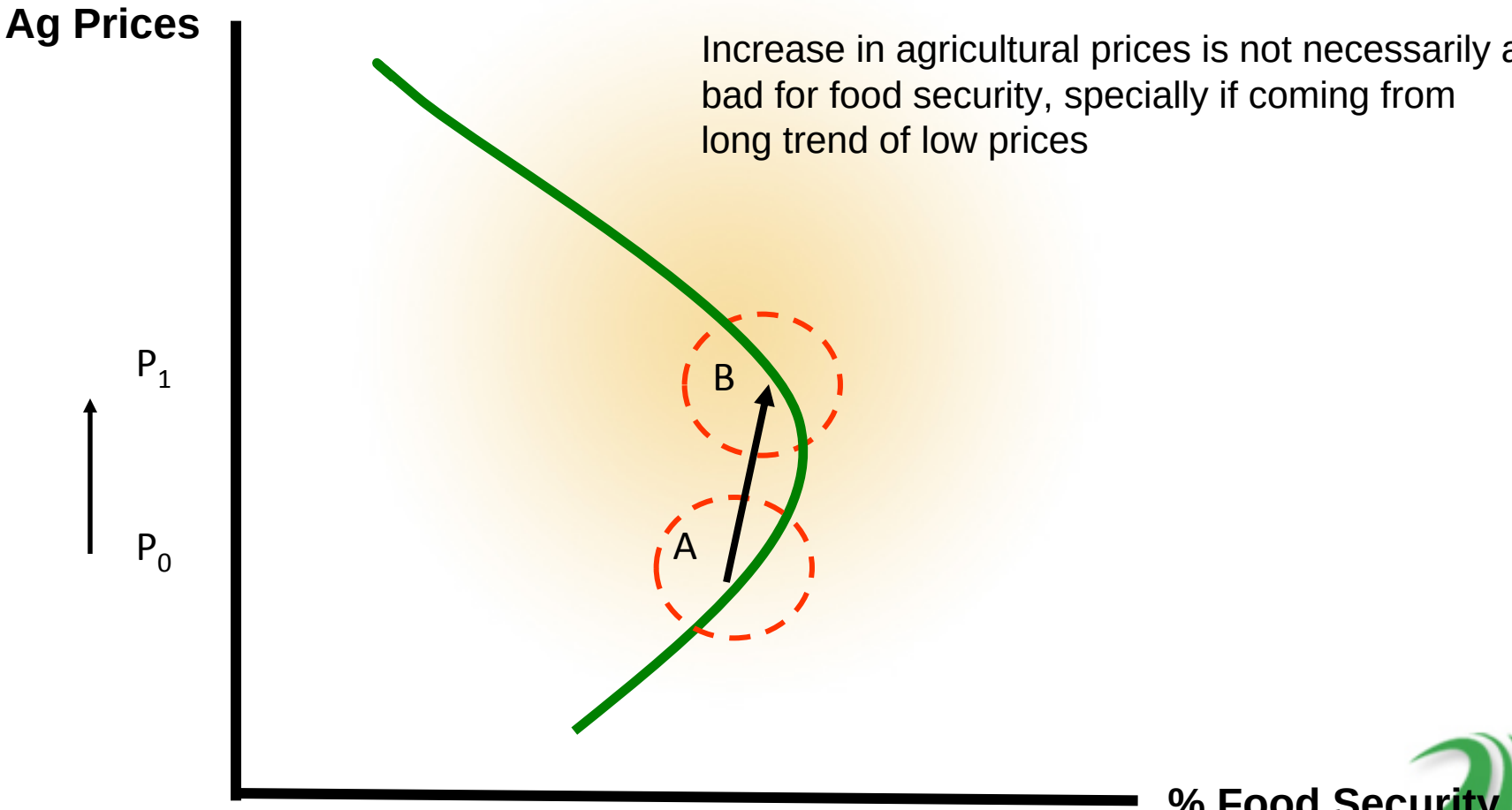
The Story:

- **Agricultural commodity prices went from depressed to walking on a “razor’s edge”**
- **Biofuels were “the straw that broke the camel’s back**
- **Current industrial agricultural system is not sustainable; biofuels sustainability largely depend on the way feedstock are produced**

The Question is

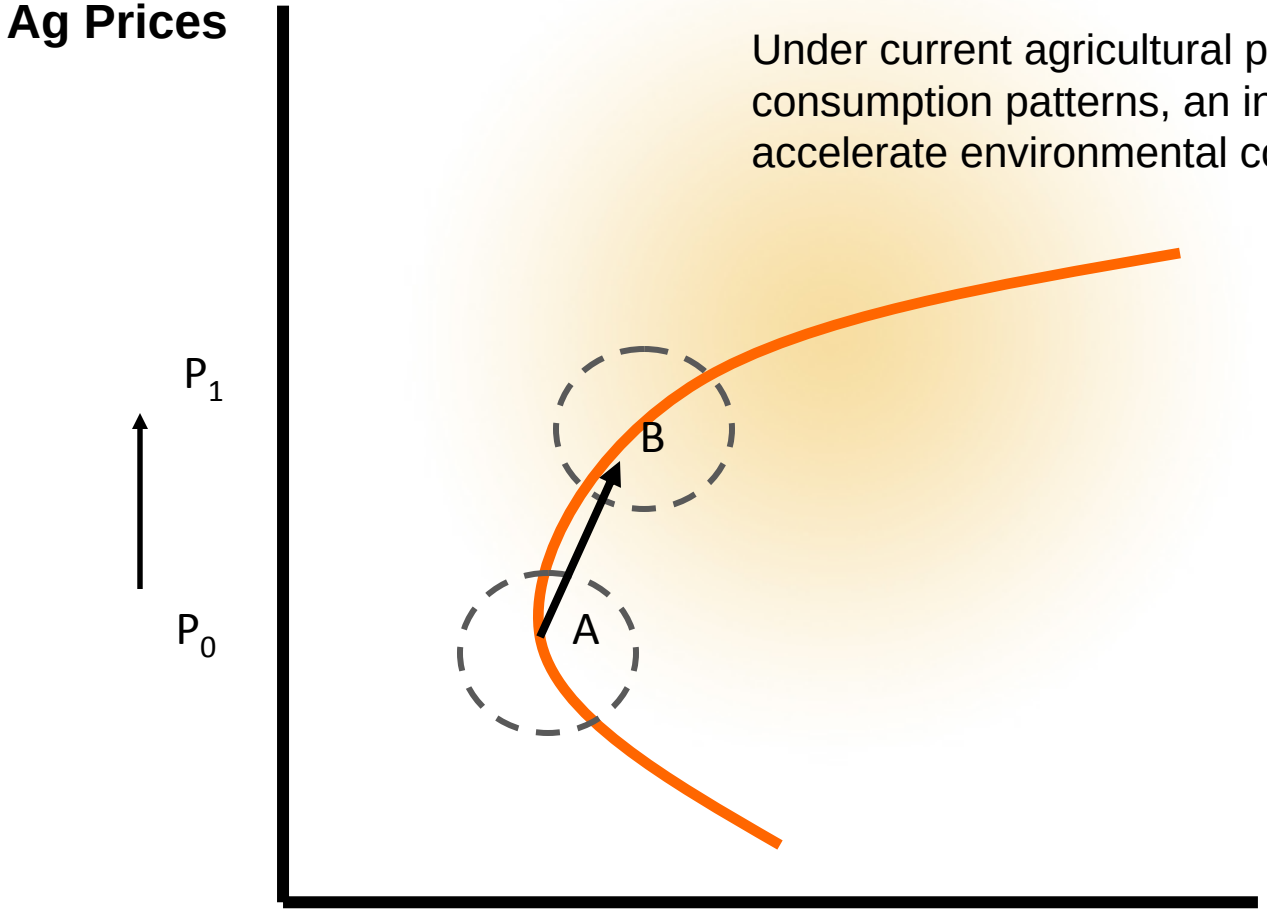
- Under which conditions biofuels can be an opportunity for:
  - Economic Development
  - Climate change / environmental benefit
  - Energy crisis / energy independence
- Increased Ag prices would drive new investment into agriculture
  - Type on investment matters. A LOT !

Trade off Between Agricultural Prices and Food Security



Increase in agricultural prices is not necessarily a bad for food security, specially if coming from long trend of low prices

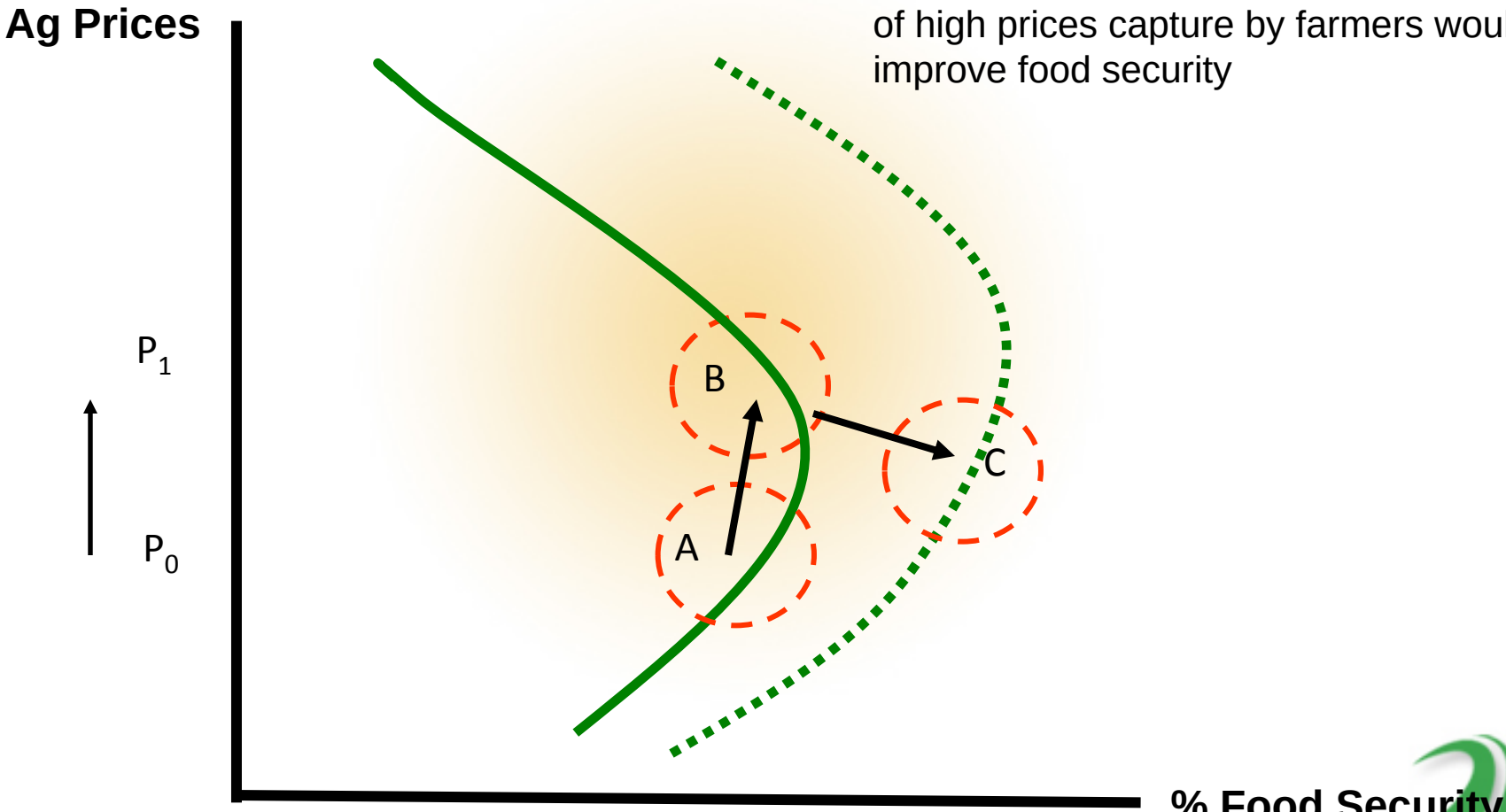
Trade-off Between Agricultural Prices and Environmental Cost



Under current agricultural practices and food consumption patterns, an increase in ag prices could accelerate environmental costs

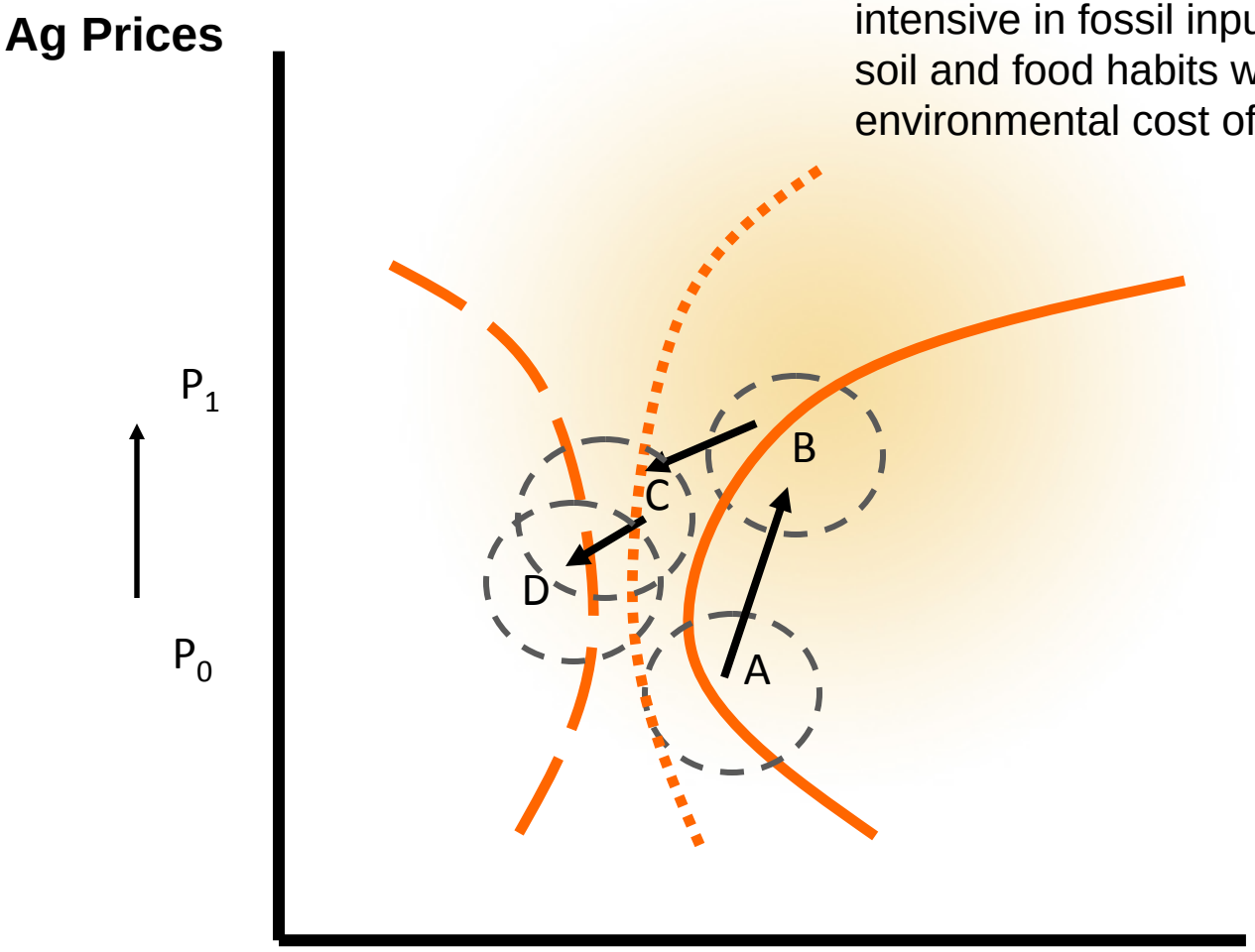
Expand the Impact of Higher Prices in Food Security

Investments directed to improve share of high prices capture by farmers would improve food security



Higher Ag Prices Create Conditions to Invest in reducing Environmental Cost

Investment in agricultural technologies less intensive in fossil inputs, and in tune with local soil and food habits would reduce environmental cost of agriculture



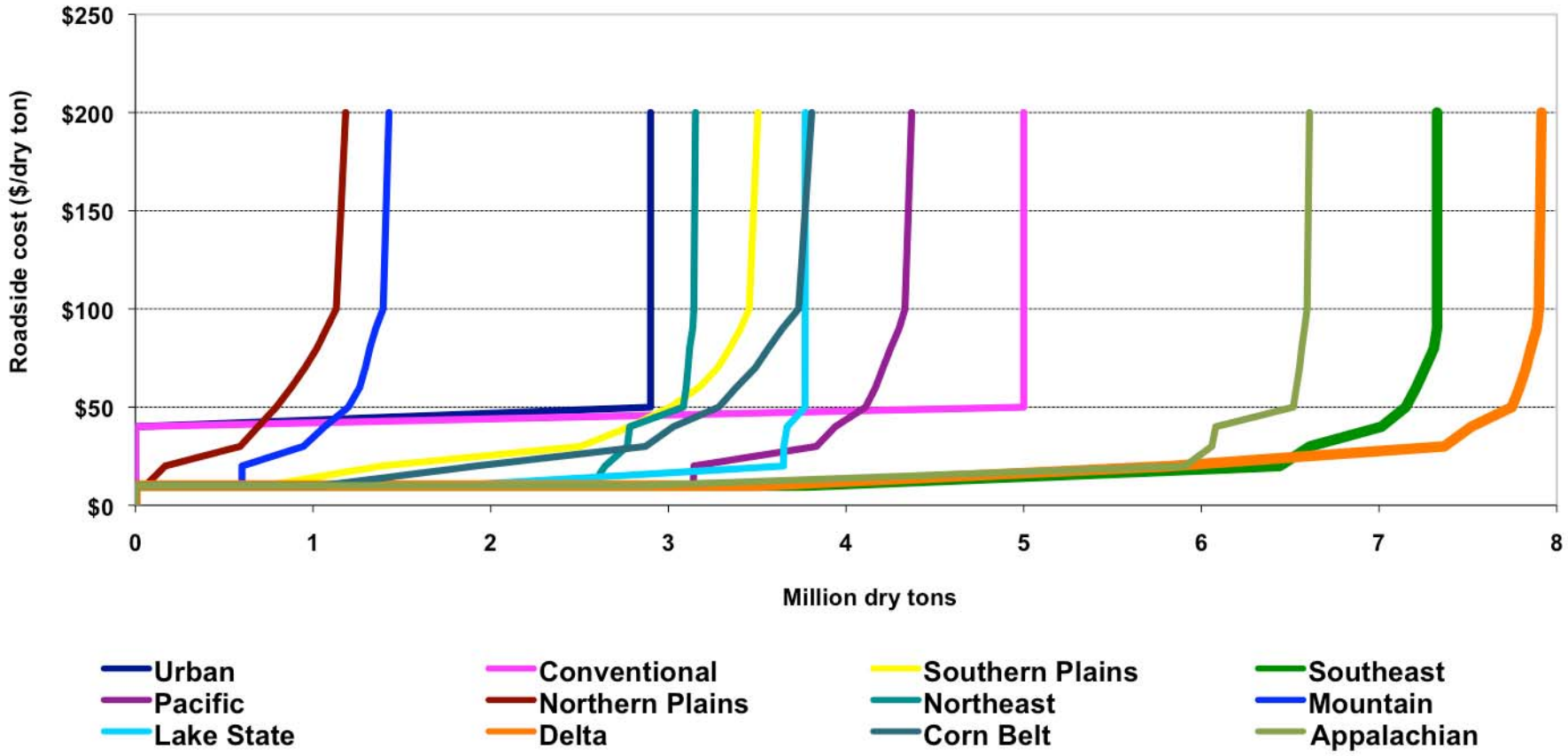
Forestry Feedstock Resources

(million dry tons)

Source	Reference Scenario 2022	Upper bound
Logging residues	20.1	40.1
Other residues	6.1	12.2
Thinnings from timberland	10.9	20.8
Thinnings from other timberlands	0	0
Primary mill residues	1.3	1.3
Urban wood residues	2.8	14.0
Conventional sourced wood	3.5	15.0
Total	44.7	102.8

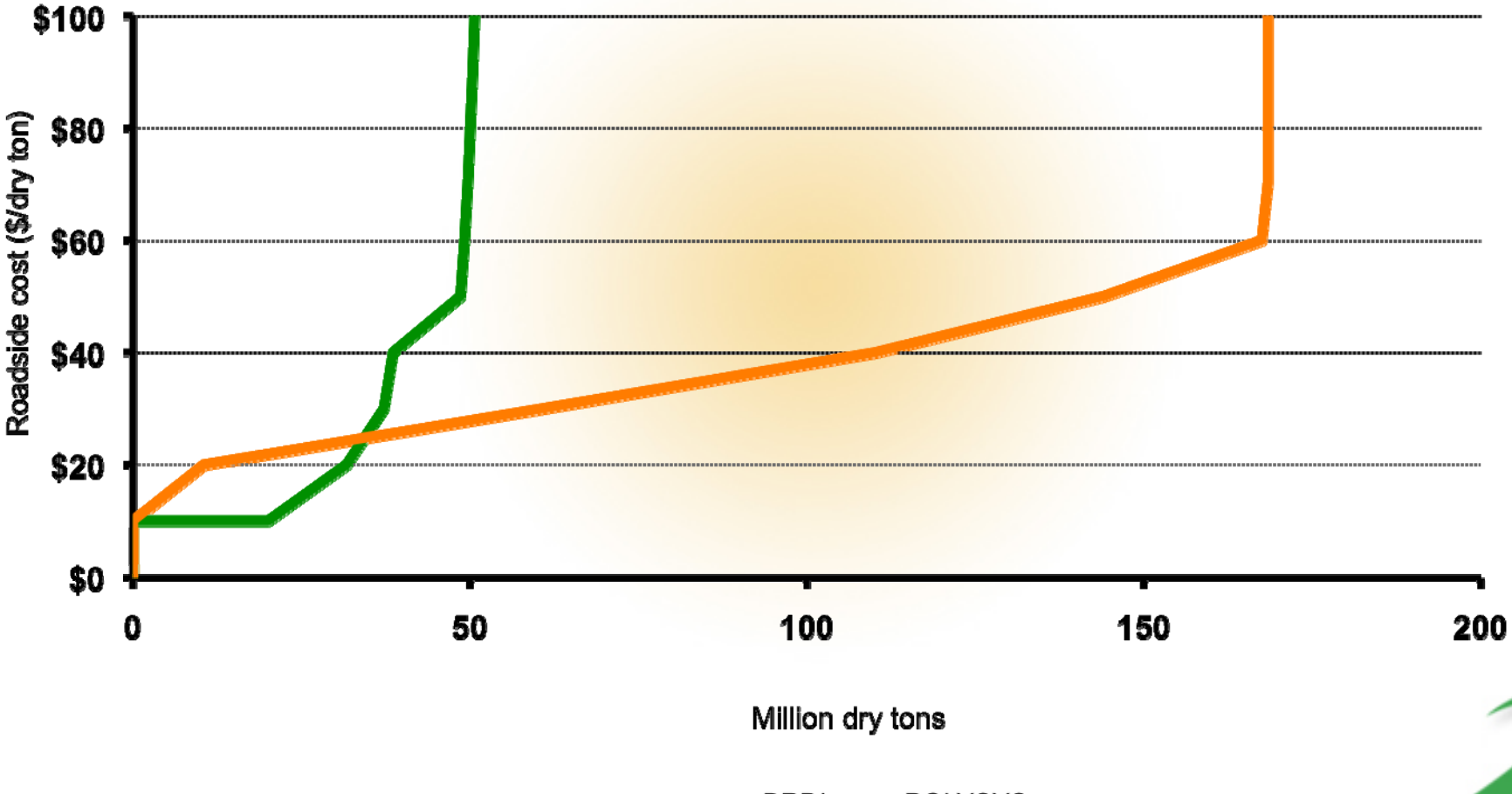
Regional Forest Supply

(Reference Scenario – BRDI)



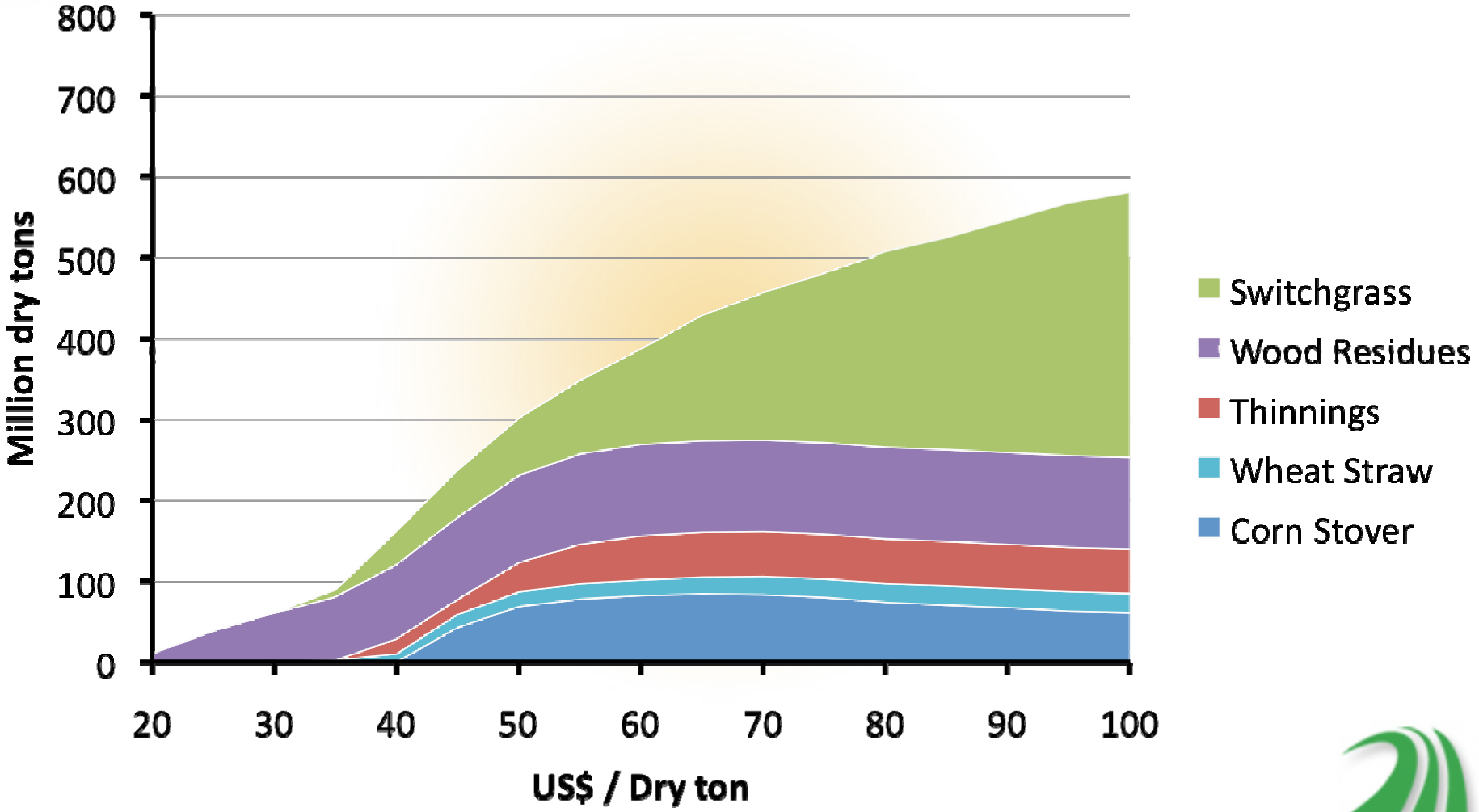
Forestland Biomass Supply

(BRDI Reference vs. POLYSYS)



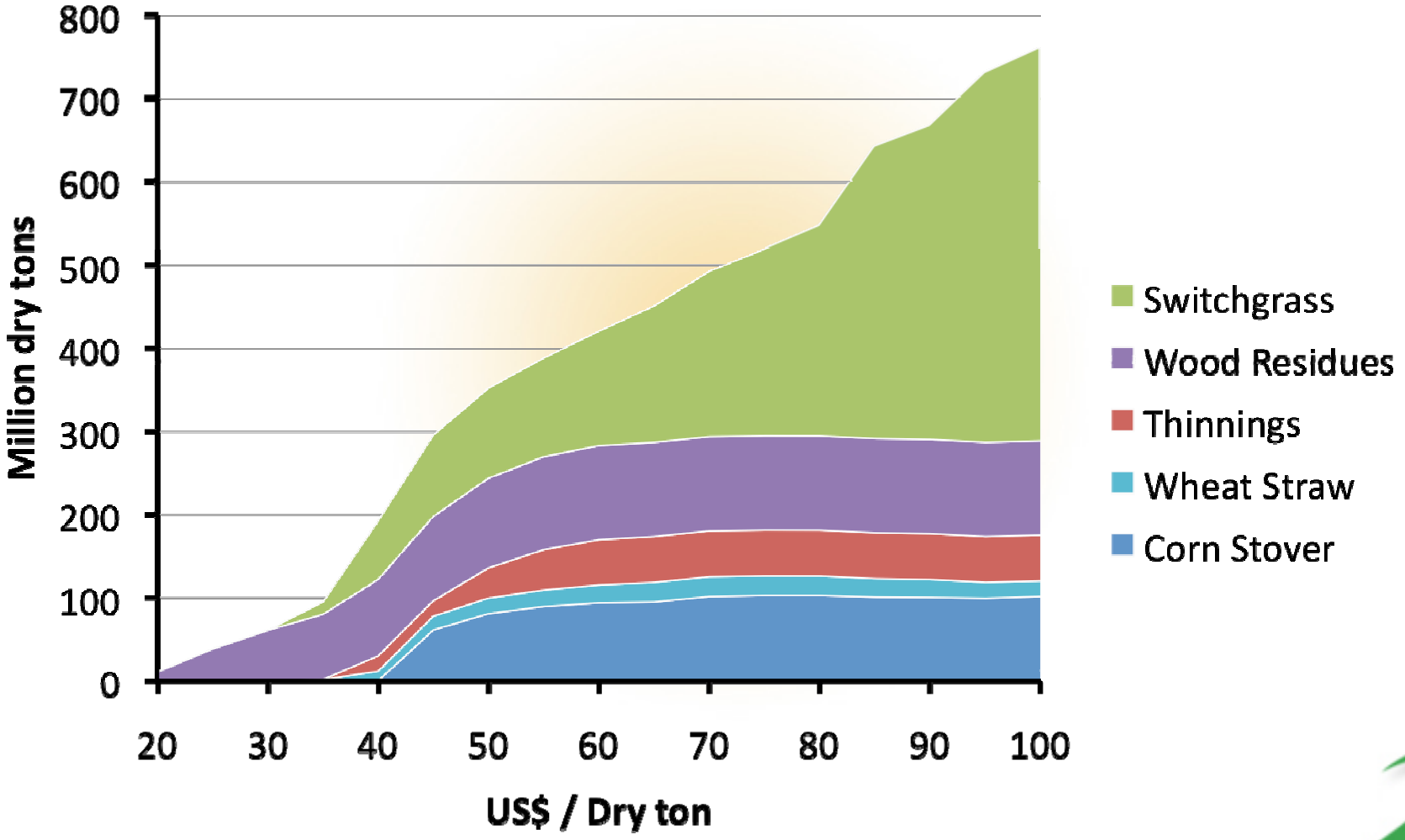
Cellulosic Feedstock Supply -2015

(million dry tons)

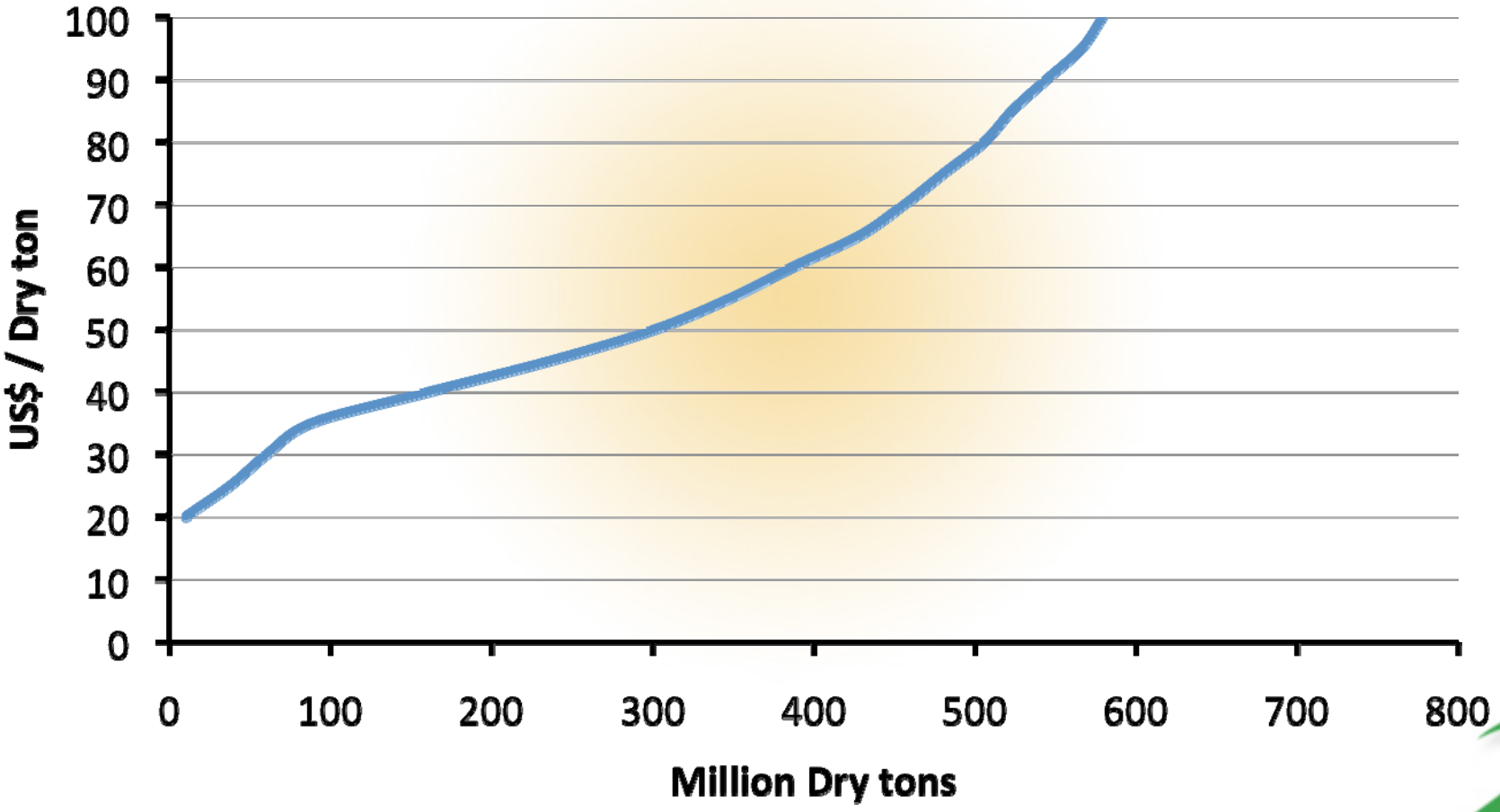


Cellulosic Feedstock Supply -2022

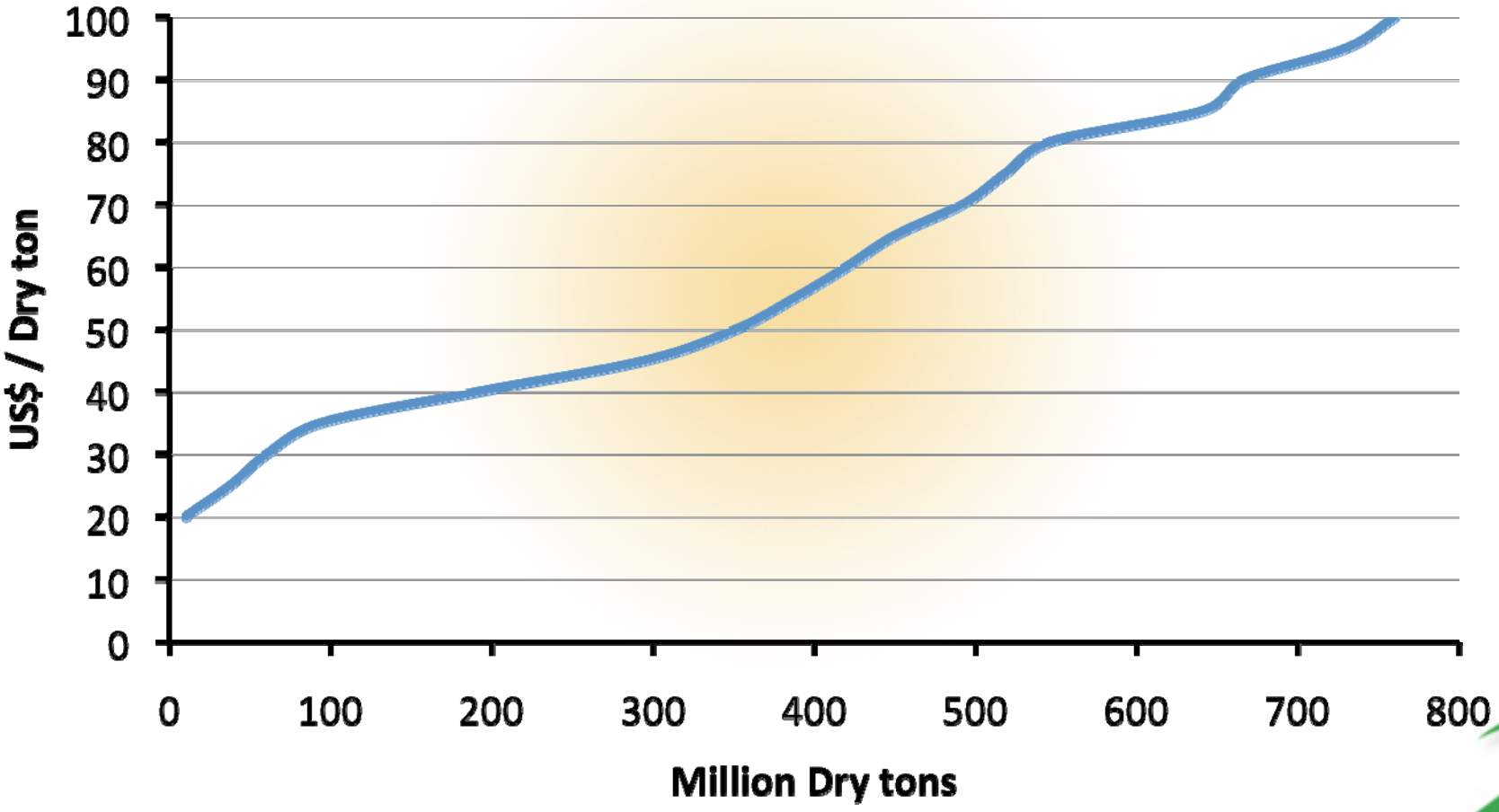
(million dry tons)



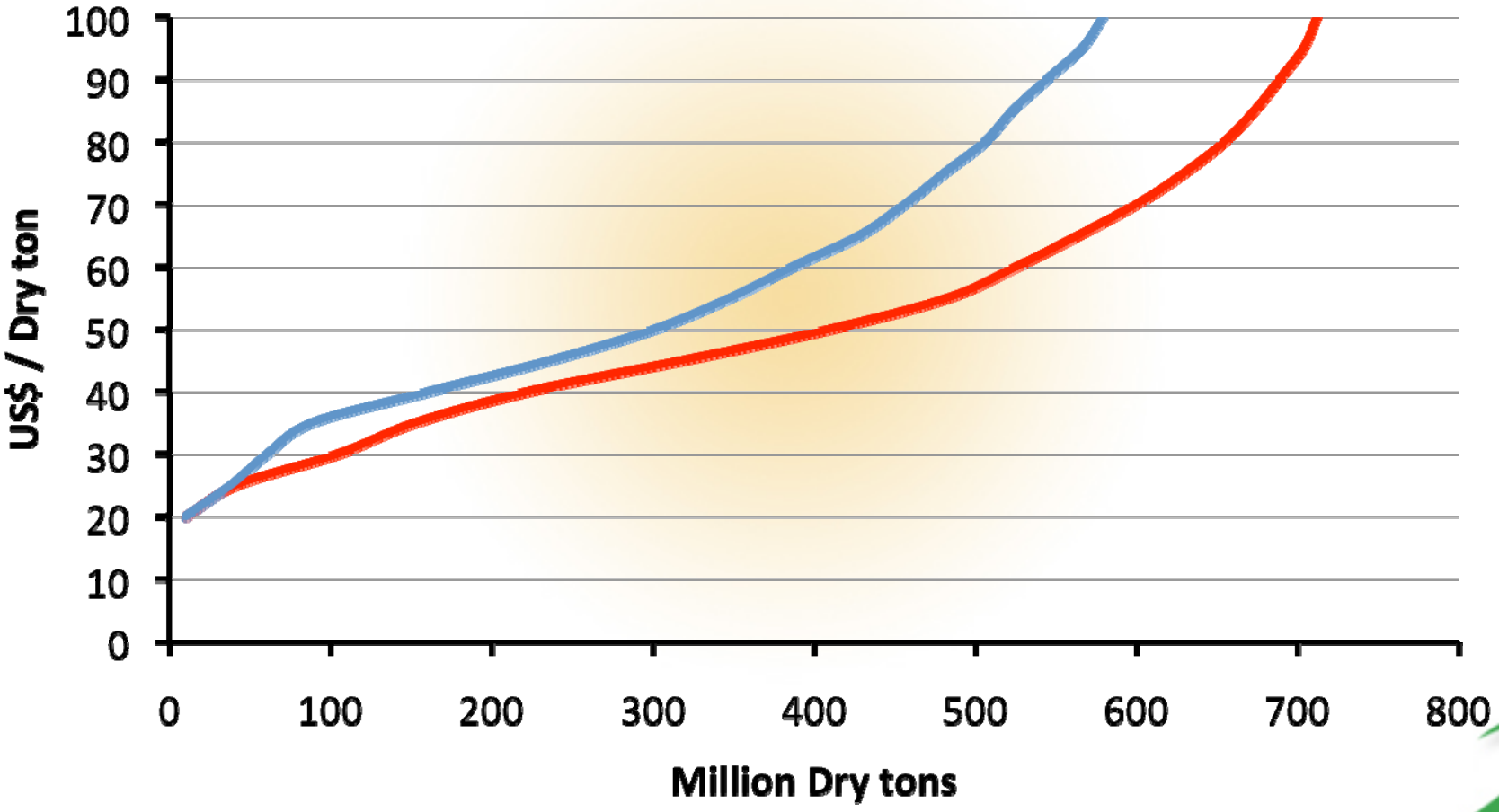
Cellulosic Supply Curve -2015



Cellulosic Supply Curve - 2022

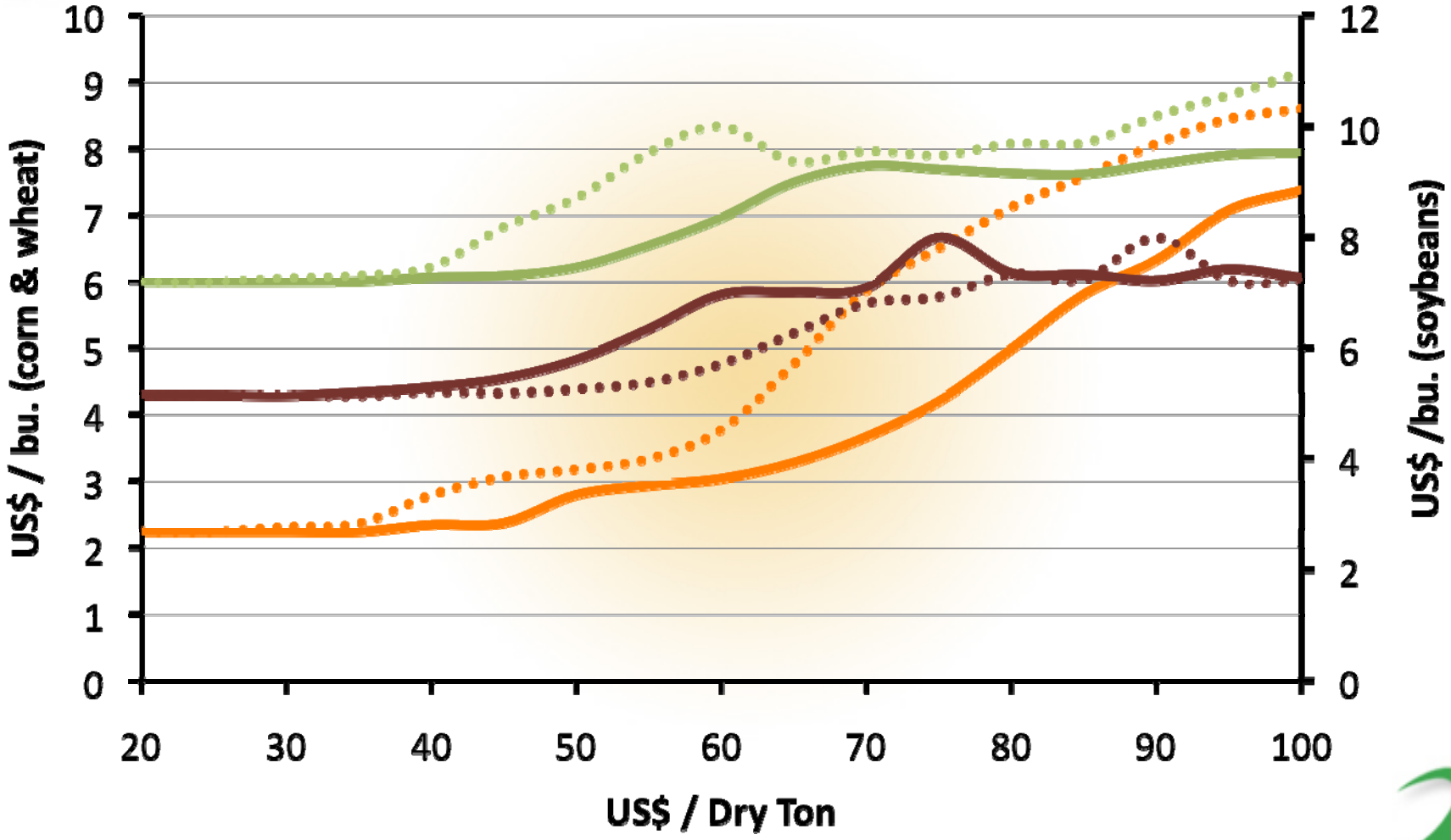


Cellulosic Supply Curve -2015 Increase Ag Productivity

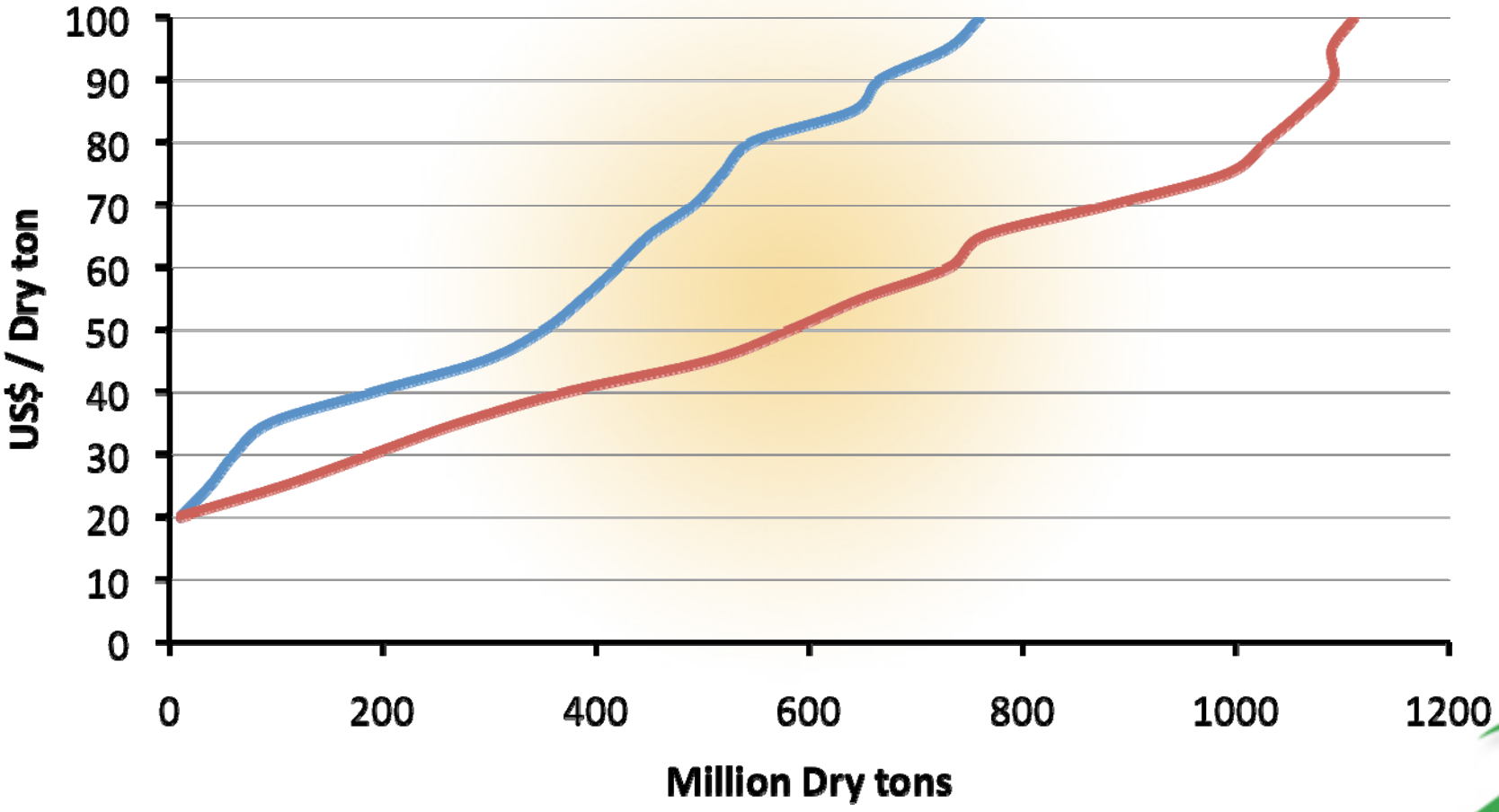


Crop Prices vs. Cellulosic Price – 2015

Average vs. High Productivity

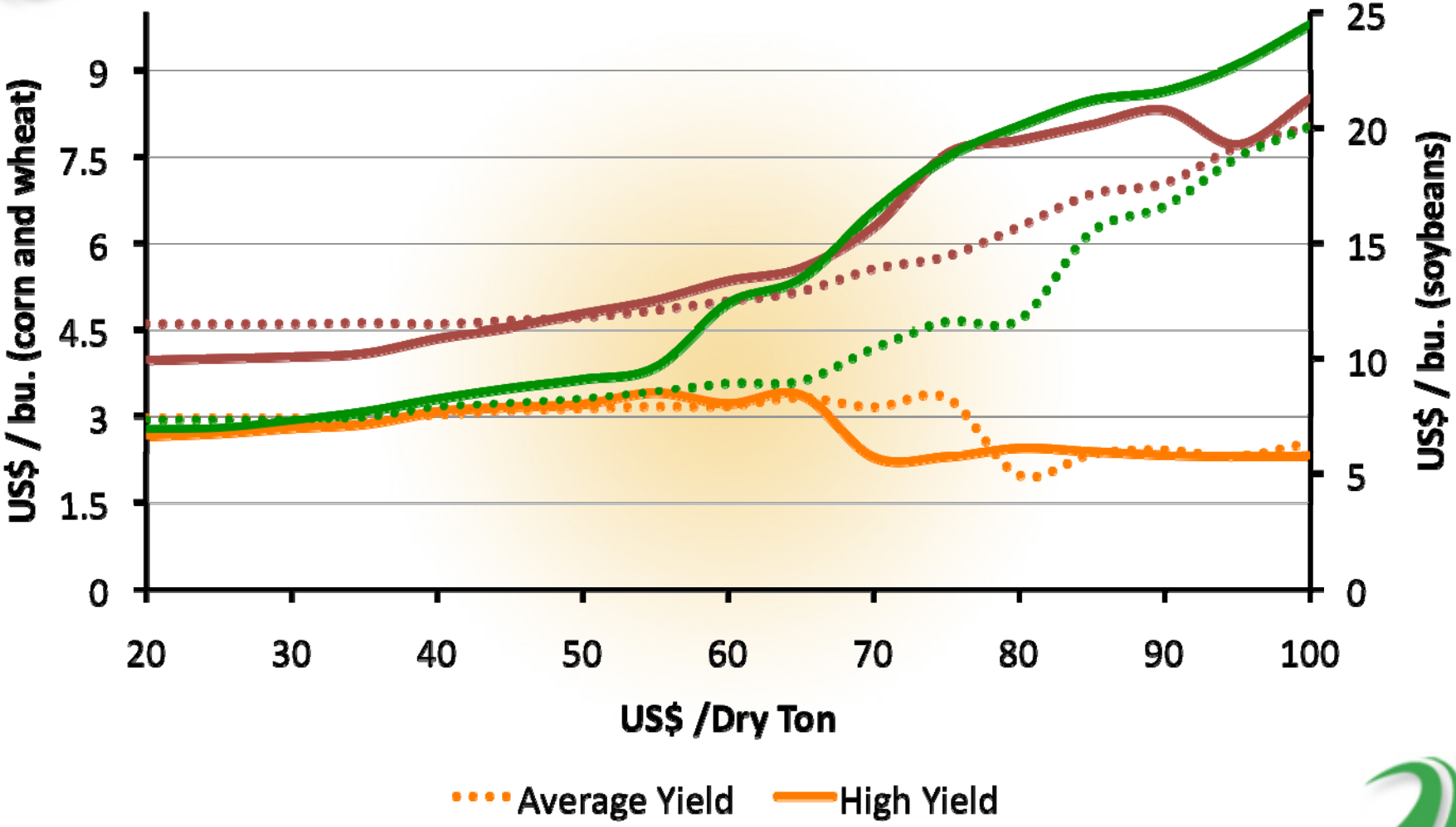


Cellulosic Supply Curves -2022 Increase Ag. Productivity



Crop Price vs. Cellulosic Price - 2022

Average vs. High Productivity



Concluding Remarks

- **Biofuels could result in a massive transfer of resources to the ag sector**
- **Biofules provides the profitability to invest in agriculture and radically change what, how, and where we produce**
- **Speed of expansion of biomass supply would have significant cross crop impacts**
- **Forestry resources are key for the initial stage and for attenuating impacts of crop prices**

Thanks !

Bio-based Energy Analysis Group
http://beag.ag.utk.edu/

Agricultural Policy Analysis Center
http://agpolicy.org/

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